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**TEACHING AND EXERCISE AID TO IMPROVE HUMAN MOVEMENTS**  
[Lern- und uebungshilfe zur Verbesserung des menschlichen  
Bewegunsablauf]

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LEARNING AND PRACTICING AID FOR IMPROVING ROMAN MOTION SEQUENCESSpecification:

The invention concerns a learning and practicing aid for learning and/or improving human motion sequences, in particular motion sequences in sports, using a video camera and at least one monitor or projector with a screen.

In order to learn and/or improve human motion sequences, in particular motion sequences in sports, for example, in tennis or golf games, technical disciplines of light athletics, such as discus throwing or shot put, but also in ballet dancing and theater plays, there are numerous learning aids in the literature. Very particularly in the sport of golf is spent a lot of money, for example, for golf lessons with a golf instructor or for other technical aids, of which a large number is offered in the market. The golf swing is not a natural motion, and is effective only in persons that have worked for years on their swing and carry it out naturally. In order to achieve this is required a complicated motion sequence of the members of the body, in particular the legs, arms and hands. All the phases of the motion sequence must match in order to 2

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<sup>1</sup> Numbers in the margin indicate pagination in the foreign text.

achieve an optimal swing path of the head of the club. The same applies also for all other sports types. In order to learn to play golf consistently well, it is important to carry out the motions correctly from start to finish. For this purpose, the consecutive phases, that is, the motion sequence, must be known well, that is, an image thereof must be present in the head.

The beginner, however, never carries out the motions as he believes and requires therefore constant corrections. For this reason, it is known to record on a tape with a video camera the motion sequence during the swinging of a golf club. The instructor can then indicate eventual errors in the motion sequence to the student based on recordings in the form of a video analysis.

It is also known to record on a tape with a video camera the ideal motion sequence, for example, of an instructor. On another tape are then recorded the motion sequences of the student. The recorded motion sequences can then be observed on two screens and compared to each other. The two motion sequences can be synchronized with the aid of sensors and these can be shown superimposed on the screens, so that the slightest deviations between the two motion sequences can be detected (WO 88/07735).

From United States patent 3,353,282 is known a learning aid for the motion sequence during the swinging of a golf club. In this known device, an image of the golf instructor is projected on a coated mirror during the swinging of a golf club. The student stands before the mirror and can assume the same position as the 3 instructor with the aid of a reference point. He can now either memorize the swinging sequence of the instructor, or follow the swinging motions of the instructor at the same time.

All the known learning and practicing aids have the disadvantage that the user of these aids cannot watch himself/herself when he/she is carrying out these sport motion sequences. In order to prevent this disadvantage, it is known, for example, during ballet dancing or theater plays, to carry out the motions before a mirror. However, this is very hard to accomplish during a motion sequence in a sport, for example, when hitting a golf ball or a tennis ball, since the person carrying out the motion sees only an inverted image, on the one hand, and the head must move away from the ball and toward the mirror, on the other hand, so that a hitting that corresponds to reality cannot be carried out.

Also known are devices with which images taken from a distance can be observed on miniature screens. In order to bring the monitors as close to the eyes as possible, these are arranged in

a housing that can be mounted on a mount on the head of the observer. The monitors can be observed through ocular lenses, which are adjusted via adjustment units and can be adapted to the eye distance of the user (DE-OS 36 28 458 and DE-OS 38 29 011). These known devices are intended for observing stereoscopically recorded objects and motions as three-dimensional television images on miniature monitors. A device is also known, with which the images recorded by a camera can be projected on a screen. The screen and the projector are located in a helmet that is seated on the head of the observer (United States patent 3,916,094).

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The user can observe with this device simultaneously a console and the images of the surroundings recorded by the camera. These known devices are used mainly in defense technology. These devices are not suitable as learning and practicing aid for learning and/or improving human motion sequences, in particular motion sequences in sports.

It is an object of the invention to create a learning and practicing aid for improving human motion sequences, in particular motion sequences in sports, wherein a user can observe and improve if required his/her own motion sequence

while it is being carried out in order to achieve an optimal result.

This object is attained by means of the features of claim 1.

It is achieved in this way that the person that is carrying out a physical motion can observe himself/herself at the same time and not in inverse mirror image. He/she has furthermore the possibility of observing in different perspectives by modifying the position of the camera. Even though he/she has an accurate perception of how the physical motion sequence must take place, the actual motion sequence can considerably deviate from the optimal sequence, because the person cannot observe the execution of the motion at the time when it takes place. In particular when learning and exercising sports motion sequences, such as, for example, during the swinging of a golf club, the object of the invention is very advantageous, since the user can observe himself/herself during the swinging of the golf club. He/she can thus transfer the instructions of the instructor/5 directly to his/her swinging motion. He/she can see thus if the theory of the motion sequence coincides with the practice. If not, he/she can accordingly improve his/her motions. The housing with the monitor arranged therein can be mounted in such a way on the mount that the adjustable ocular lenses, which are connected to the monitor via reflecting mirrors, can be located

directly before the eyes of the user in the working position. An ocular lens is preferably provided for each eye. The ocular lenses can be adapted to the eye distance of the user by means of adjustment units. The sharpness adjustment of the ocular lenses occurs via an ocular adjustment. The monitor image can be perceived enlarged by the observer by means of a reflecting mirror arranged in the housing. The monitor image is preferably visible as a partial region within the visual range of the ocular lenses, so that the user sees his/her motion sequence and his/her direct vicinity during the execution. This advantage is also provided if the video image is projected on a transparent screen, since herein the observer sees simultaneously the surroundings and himself/herself on the screen. The image transmission from the video camera to the monitor or projector can occur via wires or wirelessly, while the wireless transmission is preferred, since the motion freedom is not limited therewith. With the transmission via wires, the camera takes over the power supply for the device pursuant to the invention. If required, an amplifier of the video signal can be utilized. With the wireless transmission, the device pursuant to the invention is equipped with its own power supply. Eye cups are provided on the housing in front of the ocular lenses, so that the image on the monitor is not affected by the incident/6



light. The ideal motion sequence for the student can be preferably faded in on the monitor with the aid of a computer and a corresponding program. The images prepared by the computer are synchronized with the images of the video camera. This has the advantage that the student or person that is practicing can also carry out at home the predetermined instructions provided by the instructor.

The drawings show exemplary embodiments and are described in more detail below, wherein:

Figure 1 shows a schematic representation of a golf player with the object of the invention, wherein the transmission from the video camera to the monitor occurs via a wire,

Figure 2 shows the object of the invention of Fig. 1 with wireless transmission,

Figure 3 shows a schematic representation of the object of the invention in a view on the ocular side,

Figure 4 shows a schematic representation of Fig. 3 in plan view, and

Figure 5 shows a further embodiment with projector and screen.

Figure 1 shows schematically a golf player in the starting position. The housing 1, with the monitor 2 arranged therein, is mounted by means of a helmet-like mount 3 on the head of the 7

golf player. The transmission from the video camera 4 to the monitor 2 occurs via a wire 5. In the representation of Fig. 2, the transmission from the video camera 4 to the monitor 2 occurs wirelessly via a transmitter 6 and a receiver 7. Between the receiver 7 and the monitor 2 is provided a transmission wire 15. Figures 3 and 4 show the housing 1 with the mount 3 mounted thereon, which can be shaped like a helmet or glass frame. Within the housing 1 are arranged the monitor 2, the reflecting mirror 8, and the electronics 9. Ocular lenses 10, whose sharpness adjustment occurs via ocular adjustments 11, are provided on the housing 1. Within the range of the ocular lenses 10 are arranged eye cups 12, which protect the eyes of the observer from incident light. The ocular lenses 10 can be adapted to the eye distance of the observer by means of an adjustment unit 13. Herein, it is conceivable that an ocular lens can be adjusted by means of a known mechanism or both lenses can be adjusted (as known in binoculars) via a joint. A wired connection 14 is provided for the transmission wire 5 in the housing 1. Figure 5 shows a further embodiment, wherein a projector 16 and a transparent screen 17 are arranged in the housing 1. The images transmitted by the video camera are projected by the projector on the transparent screen. The user can observe himself/herself on the screen 17 through the ocular

lenses 10 during the execution of his/her sport motion sequence and can perceive at the same time the surroundings via the transparent screen 17.

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**Reference Data:**

- 1 = housing
- 2 = monitor
- 3 = mount
- 4 = video camera
- 5 = wire
- 6 = transmitter
- 7 = receiver
- 8 = reflecting mirror
- 9 = electronics
- 10 = ocular lens
- 11 = ocular adjustment
- 12 = eye cup
- 13 = adjustment unit
- 14 = wired connection
- 15 = transmission cable
- 16 = projector
- 17 = screen

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**Patent Claims:**

1. Learning and practicing aid for learning and/or improving human motion sequences, in particular motion sequences in sports, utilizing a video camera (4) and at least on monitor (2) or projector (16) with screen (17), wherein the monitor (2) or the projector (16) with screen (17) and electronic components (9) is arranged in a housing (1), which is mounted by means of a mount (3) within the range of the eyes on the head of the user in the working position.
2. The learning and practicing aid of claim 1, wherein one or several ocular lenses (10) are provided on the housing (1), which can be adjusted by means of an ocular adjustment (11), and wherein the monitor image can be perceived enlarged by means of reflecting mirrors (8) arranged in the housing (1).
3. The learning and practicing aid of claim 2, wherein the monitor image is visible as a partial region within the visual range of the ocular lenses (10).
4. The learning and practicing aid of claim 3, wherein eye cups (12) are arranged in front of the ocular lenses (10). /10
5. The learning and practicing aid of claim 4, wherein at least one ocular lens (10) can be horizontally adjusted for adaptation to the respective eye distance of the user.

6. The learning and practicing aid of one of the preceding claims, wherein the image transmission from the camera (4) to the monitor (2) or projector (16) occurs via a wire (5) or wirelessly.
7. The learning and practicing aid of one of the preceding claims, wherein the ideal motion sequence can be faded in by means of a computer program on the monitor (2) or screen (17).





